spin speed. Another subject was the definition of criteria for the scientific success of the GP-B mission i.e. the final accuracy in the measurement of the gyroscope precession for changing conditions during flight. Using different mission durations (amount of data collected in orbit), the relationship between measurement duration and final experiment accuracy was established with the error analysis model. R. Decher has visited Stanford University many times the period of performance to participate in the Science Advisory Committee meetings and monthly reviews of GP-B. In addition, several topics related to the experiment error analysis and data reduction were discussed e with the Stanford team during these visits. This included alternate mathematical approaches developed by the UAH group. An interim report on the application of the least squares analysis (by P. Eby) was published in January 1999. Several brief presentations on various subjects were given to the GP-B Project Office.

(3)/ew/ IN192

SOLAR PHYSICS 20011116188

The solar physics group (consisting only of UAH employees). The areas of emphasis are: (a) develop theoretical models of the transient release of magnetic energy in the solar atmosphere, e.g., in solar flares, eruptive prominences, coronal mass ejections, etc.; (b) investigate the role of the Sun's magnetic field in the structuring of solar corona by the development of three-dimensional numerical models that describe the field configuration at various heights in the solar atmosphere by extrapolating the field at the photospheric level; (c) develop numerical models to investigate the physical parameters obtained by the ULYSSES mission; (d) develop numerical and theoretical models to investigate solar activity effects on the solar wind characteristics for the establishment of the solar-interplanetary transmission line; (e) develop new instruments to measure solar magnetic fields and other features in the photosphere, chromosphere transition region and corona.During the period, we focused our investigation on the fundamental physical processes in solar atmosphere which directly effect our Planet Earth. The overall goal is to establish the physical process for the Sun-Earth connections.

Dr. David Falconer, Research Associate, has been primarily investigating coronal heating using a combination of Yohkoh/SXT, SOHO/EIT, MSFC vector magnetograms, Kitt Peak magnetograms, and SOHO/MDI. This has involved analysis of coronal heating in active regions, with investigation of the role of global nonpotentiality. He has also investigated quiet sun coronal heating. Also, and has done a pilot study on the two quantitative predictors of which active regions might produce flare-associated coronal mass ejections. The first having to do with quiet sun heating, and the second with non-Maxwellian effects on line-ratio temperature diagnostics.

Dr. Manfred Cuntz has been involved in a variety of projects relevant to solar and stellar astrophysics. His main projects were the following: (1) study of two-component chromospheric heating in stars of different magnetic activity taking K2V stars as examples. These computations made use of a magnetohydrodynamic computer code package, which had been developed by Drs. P. Ulmschneider, W. Rammacher, Z.E. Musielak, and M. Cuntz. The code package allows the treatment of the generation, propagation, and dissipation of magnetic and acoustic wave modes and the formation of specific spectral emission lines. The performed simulations allowed the explanation of the empirically deduced relationship between the Ca~II and Mg~II emission and

the stellar rotation rate by starting from first principles. (2) Involvement in assembling a paradigm to explain the interactions between extra-solar giant planets and the outer atmospheres of their host stars. Up to date, about 30 extra-solar planets have been identified including one extra-solar planetary system (ups And). Some of those planets have masses comparable to or larger than Jupiter and are in very close proximity to their host stars. The proposed paradigm will be able to explain the existence of both magnetic and tidal interaction and provides a roadmap for the explanation of stellar "superflares" initiated by the planets. and (3) A further research project involved the study of fine structure of the solar wind, particularly solar plumes. Plumes are bright rays in coronal holes, visible between one and several solar radii. The empirical properties of plumes have recently been analyzed using instruments onboard of SOHO [Solar and Heliospheric Observatory]. The aim is to provide reasonable theoretical models for these structures. In addition, Dr. Cuntz served as co-organizer and participant of the Topical Discussion Session "Understanding the Role of Binarity on Mass Loss and Atmospheric Structure in Detached Systems", Eleventh Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, Tenerife, Spain (October 1999). The research effort has resulted in Dr. Cuntz participating as an invited speaker at the Center for Excellence in Information Systems, Tennessee State, University, Nashville, Tennessee in July 1999; Eleventh Cambridge Workshop on Cool Stars, Stellar Systems,and the Sun, Tenerife, Spain in October 1999; Department of Physics, University of Texas at Arlington, Arlington, Texas in October 1999; Space Science Laboratory, Marshall Space Flight Center, Huntsville, Alabama in January 2000; and the UAH Department of Physics in February 2000.

Drs. A. H. Wang and S. T. Wu participate in collaborative research with Dr. Steve Suess at MSFC's Space Science Laboratory. They have been developing a series of global coronal models directed at a better simulation of coronal hole and streamer properties.

Within the Solar Physics Group is a sub-group (Astrobiology Group) lead by Dr. Richard Hoover at the NASA/MSFC. During the period of performance research was preformed on the ancient microfossils and micro-organisms such as cyanobateria assoicated with ancient phospherous and meteorites for studies of living ancient micro-organisms using the environmental scanning electron microscope at NASA/MSFC. The research effort was in collaboration with the Russian Academy of Sciences. Dr. Sabit Abyzov of the Institute of Microbiology, visited the NASA/MSFC (Dr. Richard Hoover) to discuss joint collaborative research on ancient microorganisms from the deep ice cores recovered from Vostok Station, Antarctica and to participate in the Studies of Deep Ice Microorganism Conference in Denver, Colorado during the time period July 10 – 28, 1999. Dr. Alexei Yu Rozanov, Institute Director, Paleontological Institute, Russian Academy of Sciences was invited to visit the NASA/MSFC (Dr. Richard Hoover) in Huntsville, AL and participate in the Studies of Deep Ice Microorganism Conference in Denver, Colorado during the time period July 18 – 28, 1999. Dr. Rozanov discussed joint collaborative research on the microfossils and micro-organisms with the cyanobacteria using the environmental scanning microscope. Elena A. Vorobieva, Soil Science Faculty, Moscow State University, Russia, visited the NASA/MSFC (Dr. Richard Hoover) in Huntsville, AL and participate in the Studies of Deep Ice Microorganism Conference in Denver, Colorado during the time period July 10 – 28, 1999. She discussed the joint collaborative research on viable microorganisms in permafrost and ice. Dr. Elena Pikouta of the Instiutte of Microbiology of

Russian Academy of Science visited UAH and the NASA/MSFC during the period October 1999 – November 1999. The purpose of her initial visit is to conduct research on terrestrial extremophiles for the ongoing NASA Astrobiology program. This research effort was primarily directed toward the isolation and culture of enigmatic microbial psychrophiles from glaciers, ice wedges, and permafrost and hyperthermophiles from samples returned by Astronaut Owen Garriott from the Rainbow Deep Sea Hydrothermal Vent site. She participated in the study of the morphology of these microorganisms using the Environmental and Field Emission Scanning Electron Microscopes, the Scanning Transmission Electron Microscope, and advanced Epifluorescence and Video Optical Microscopy systems available at MSFC. Dr. Pikouta was subsequently hired by UAH to continue this research effort in the US. Professor Dr. Vladimir Ostrooumov of the Institute of Basic Problems of Biology, visited UAH and NASA/MSFC during the time period November 5 – 13, 1999 to discuss the study of water regimes in permafrost and microorganisms in permafrost with Dr. Richard Hoover and the personnel at the Space Science Laboratory. A contract for Professional Services was initiated with the Planetary Studies Foundation in support of the research on extremophile life forms in Antarctica from January 2 to January 20, 2000. Dr. Richard A. Hoover of the Marshall Space Flight Center in Huntsville, Alabama conducted His field work included the collection of numerous ice specimens from both the Patriot Hills area and the South Pole. In addition, he will be collecting specific sedimentary rocks from Patriot Hills to support this research. This will require snowmobile support to and from the Patriot Hills base camp on a daily basis, as well as a research associate/field guide who will assistant in the collection of ice and rock specimens. David G. Butts, a member of the Planetary Studies Foundation, served in this capacity. In September 1999, the UAH and the NASA/MSFC hosted the Solar B Working Group Meeting held at NASA/MSFC. In addition, during the period of performance several visiting scientists made presentations and consulted with the personnel at the NASA/MSFC and UAH concerning the Solar Space Physics. These scientists usually gave seminars at the UAH or SSL regularly scheduled seminar time.

Publications & Presentations

Falconer, D.A., Moore, R.L., Porter, J.G., & Gary, G.A., "Neutral-Line Magnetic Shear and Enhanced Coronal Heating in Solar Active Regions" EOS, 76 (46), F467, 1995,

Falconer, D., Moore, R., Porter, J., Shimizu, T., & Shearer, K., "Magnetic Shear and Enhanced Coronal Heating in Active Regions," Bull. Am. Astron. Soc., 27, 976 , 1995,

Porter, J.G., Falconer, D.A., Moore, R.L., Harvey, K.L., & Rabin, D.M., "Photospheric Origins of Enhanced High Coronal Loops", Bull. Am. Astron. Soc., 27, 966, 1995,

Porter, J.G., Falconer, D.A., Moore, R.L., Harvey, K.L., & Rabin, D.M., "Magnetic Roots of Enhanced High Coronal Loops," IAU Colloquium, 153, Makuhari, Japan, 22-26 May 1995

Porter, J.G., Falconer, D.A., Moore, R.L., Harvey, K.L., & Rabin, D.M., "Magnetic Roots of Enhanced High Coronal Loops", in Magnetohydrodynamic Phenomena in the Solar Atmosphere-Prototypes of Stellar Activity, ed., Y.Uchida, T. Kosugi, and H.S. Hudson (Kluwer: Dordrecht), 429. 1996,

Falconer, D.A., Moore, R.L., Gary, G.A., & Porter, J.G., "Magnetic Field Conditions that Produce Strong Coronal Heating in Active Regions: Ranking by Magnetic Volume Ratio," EOS, 77 (46), F559, 1996,

Moore, R.L., Falconer, D.A., Porter, J.G., Gary, G.A., & Shimizu, T, "Evidence that Strong Coronal Heating Results from Photospheric Magnetic Flux Cancellation," Bull. Am. Astron. Soc., 28, 963, 1996,

Porter, J.G., Falconer, D.A., Moore, R.L., Harvey, K.L., Rabin, D.M., & Shimizu, T., "Microflaring in Sheared Core Magnetic Fields and Episodic Heating in Large Coronal Loops," Bull. Am. Astron. Soc., 28, 941, 1996,

Falconer, D.A., Allen, G.A., Moore, R.L., & Porter, J.G., , "3D Magnetic Fields and Coronal Heating in Active Regions," Bull. Am. Astron. Soc., 28, 963, 1996

Falconer, D.A., Gary, G.A., Moore, R.L., & Porter, J.G., SCOSTEP 1996, Apr. 9 "3D Magnetic Fields and Coronal Heating in Active Regions," Huntsville Workshop on Measurements and Analyses of the 3D Solar Magnetic Fields, April 9-11, 1996

Wu, S. T., Y. C. Xiao, Z. E. Musielak and S. T. Suess, Propagation of MHD Body and Surface Waves in Magnetically Structured Regions of the Solar Atmosphere, Solar Phys., 163, 291, 1996.

Suess, S.T., A.-H Wang, and S.T. Wu, Volumetric Heating in Coronal Streamers, J. Geophys. Res., 101(A9), 19,957, Sept. 1996.

Guo, W.P., S.T. Wu, and E. Tandberg-Hanssen, Disruption of Helmet Streamers by Current Emergence, Ap. J., 469, 944, Oct. 1996.

Wu, S.T., Y.C. Xiao, Z.E. Musielak, and S.T. Suess, Propagation of MHD Body and Surface Waves in Magnetically Structured Regions of the Solar Atmosphere, Solar Physics, 163, 291, 1996.

Cheng, C.-C., K.P. Dere, S.T. Wu, M.J. Hagyard, and E. Hiei, Coronal Structure and Heating: Comparison Between SXT/YOKOH Observations of An Active Region and Magnetogram, Adv. Spce Res., 17(4/5), 205, 1996.

Falconer, D.A., Moore, R.L. Porter, J.G., Gary, G.A. & Shimizu, T., "Neutral-Line Magnetic Shear and Enhanced Coronal Heating in Solar Active Regions", Ap.J., 482, 519,1997,

Falconer, D.A., Moore, R.L., & Porter, J.G., "Micro Coronal Bright Points Observed in the Quiet Magnetic Network by SOHO/EIT," Workshop on High Resolution Solar Atmospheric Dynamics held in Gloucester, MA. June 3, 1997

Falconer, D.A., Davila, J.M., & Thomas, R.J., "Relative Elemental Abundance of the Quiet Solar Corona Determined by SERTS", Ap.J., 482, 1050, 1997,

Falconer, D.A., "A Correlation between Length of Strong-Shear Neutral Lines and Total X-ray Brightness in Active Regions", AAS Bulletin, 29, 865 1997,

Falconer, D.A., "A Correlation between Length of Strong-Shear Neutral Lines and Total X-ray Brightness in Active Regions", Solar Physics, 176, 123, 1997,

Falconer, D.A. Moore, R.L., Porter, J.G., & Hathaway, D.H., "Network Coronal Bright Points: Coronal Heating Concentrations found in the Solar Magnetic Network", Ap.J., 501, 386. 1998,

Jordan, S., Andretta, V., Garcia, A., & Falconer, D. 5th SOHO Workshop "The Corona and Solar Wind Near Minimum Activity" ESA special publication 404, published and distributed by ESA publication division ESTEC, Noordwijk Netherlands, editor O.Kjeldseth-Moe, 439 Sept 1997.

Poletto, G., M.Romoli, S. T. Suess, A. H.Wang, S. T. Wu, Inferences on Coronal Magnetic Fields from SOHO UVCS Observations, (Special Issue) Solar Phys. 174, 53-63, 1997.

Suess, S. T., G. Poletto, A. H. Wang, S. T. Wu, and I. Cuseri, The Geometric Speading of Coronal Plumes and Coronal Holes, Solar Phys., 180, 231-246, 1998.

Wang, A. H., S. T. Wu, M. Dryer, D. Hathaway, V. Obridko, V. Fomichev, A. F. Kharshiladze, L. Zhitnik and V. Slemzin, Analysis and Modeling of Coronal Holes Observed by Coronas-I: II. MHD Simulation, Proceedings of the Third SOLTIP III Symposium, October 14-18, 1996, Beijing, China, X. S. Feng, F. S. Wei and M. Dryer (eds) 273-278, International Academic Publishers, 1998.

Wang, A. H., S. T. Wu, S. T. Suess, G. Poletto, Global Model of the Corona with Heat and Momenum Addition, J. of Geophys. Res., 103, A2, 1913-1922, Feb., 1998.

Falconer, D.A., Jordan, S.D, Davila, J.M., Thomas, R.J, Andretta, V., Brosius, J.W., & Hara, H., "Using Strong Solar Coronal Emission Lines as Coronal Flux Proxies", Solar Physics, 180, 179, 1998,

Falconer, D.A., Moore, R.L., Porter, J.G., & Hathaway, D.H., "Large-Scale Coronal Heating, Clustering of Coronal Bright Points, and Concentration of Photospheric Magnetic Flux," SOHO 7 Workshop on Coronal Holes and Solar Wind Acceleration, held in Northeast Harbor, Maine, 28 Sept. 1-Oct. 1998

Moore, R.L., Falconer, D.A., Porter, J.G., Suess, S.T., "Coronal Heating by Magnetic Explosions," SOHO 7 Workshop on Coronal Holes and Solar Wind Acceleration, held in Northeast Harbor, Maine, 28 Sept. 1-Oct. 1998

Falconer, D.A., Gary, G.A., Moore, R.L., & Porter, J.G., "Dominance of Neutral-Line Magnetic Shear over Global Nonpotentiality for Strong Coronal Heating in Solar Active Regions," EOS, 79 (17), S265, 1998,

Moore, R.L., Falconer, D.A., & Porter, J.G., "Evidence That the X-Ray Plasma in Microflares is in a Sequence of Subresolution Magnetic Tubes", EOS, 79 (17), S279, 1998,

Porter, J.G., Falconer, D.A., & Moore, R.L., "The Magnetic Roots of Enhanced Coronal Heating in Large Loops and Plumes," International Meeting on Solar Jets and Coronal Plumes held in Guadeloupe, ESA SP-421 Solar Jets and Coronal Plumes, Feb 23-26, 1998

Porter, J.G., Falconer, D.A., and Moore, R.L., "The Magnetic Roots of Enhanced Coronal Heating in Large Loops and Plumes," in "Solar Jets and Coronal Plumes," ESA 421, ed. T.-D. Guyene ("ESA Publi. Div. ESTEC: Noordwijk) 147. 1998.

M. D. Andrews, A.-H. Wang, and S. T. Wu, Observations and Modeling of an Explosive Coronal Mass Ejection as Observed by LASCO, Solar Phys. 187, 427-446, 1999

S. T. Suess, A.-H. Wang, S. T. Wu and S. F. Nerney, Streamer Evaporation, Space Sci. Rev., 87, 323-326, 1999.

Suess, S. T., A.-H. Wang, S. T. Wu, G. Poletto, and D. J. McComas, A Two-Fluid, MHD Coronal Model, J. Geophys. Res., 104(A3), 4697, 1999.

Cuntz, M.: 1999, "Properties of longitudinal flux tube waves. I. Shock amplitude relations", Astronomy and Astrophysics, 350, 1100

Falconer, D.A., Moore, R.L., Porter, J.G. & Hathaway, D.H., "Large-Scale Coronal Heating, Clustering of Coronal Bright Points, and Concentration of Photospheric Magnetic Flux", Space Science Reviews, 87, 181 1999,

Falconer, D.A., Moore, R.L. & Porter, J.G., "Micro Coronal Bright Points Observed in the Quiet Magnetic Network by SOHO/EIT", in the Proceedings of the High Resolution Solar Atmospheric Dynamics Workshop, held in Gloucester, Massachusetts, in March 1997, 1999.

Subresolution Fibrillation in X-ray Microflares Observed by Yohkoh SXT, R.L. Moore, D.A. Falconer, J.G. Porter, Sagamihara, Tokyo, Japan, 1999

Falconer, D.A., Moore, R.L., Porter, J.G., & Hathaway, D.H., "Large-Scale Coronal Heating from Cool Activity in the Solar Magnetic Network," EOS 80(46), F798 1999,

Falconer, D.A., Moore, R.L., Porter, J.G., & Hathaway, D.H., "Large-Scale Coronal Heating from the Solar Magnetic Network," Bull. Am Astron. Soc., 31, 860 , 1999,

Moore, R.L., Falconer, D.A., & Porter, J.G "On Heating Large Bright Coronal Loops by Magnetic Microexplosions at their Feet: Feasibility of Empirical Energy Requirements," Bull. Am. Astron. Soc., 31, 861, 1999,

Porter, J.G., Falconer, D.A., & Moore, R.L., "Microflaring in Low-lying Core Fields and Extended Coronal Heating in the Quiet Sun," Bull. Am. Astron. Soc., 31, 860, 1999,

Moore, R.L., Falconer, D.A., Porter, J.G. & Suess, S.T., "Coronal Heating by Magnetic Explosions," Space Science Reviews, 87, 283, 1999,

Moore, R.L., Falconer, D.A., Porter, J.G. & Suess, S.T., "On Heating the Sun's Corona by Magnetic Explosions: Feasibility in Active Regions and Prospects for Quiet Regions and Coronal Holes," Ap.J, 526, 505, 1999.

Falconer, D.A., Gary, G.A., Moore, R.L. & Porter, J.G., "An Assessment of Magnetic Conditions for Strong Coronal Heating in Solar Active Regions by Comparing Observed Loops with Computed Potential Field Lines," Ap.J., 528, 1004 2000,

Wu, S. T. A. H. Wang, S. P. Plunkett, and D. J. Michels, Evolution of Global Scale Coronal Magnetic Field Due to Magnetic Reconnection: The Formation of the Observed Blob Motion in the Coronal Streamer Belt , Astrophysical Journal, 545, 1101-1115, 2000.

Falconer, D.A. 2000, "Measurement of Active-Region Global Nonpotentiality for Prediction of Coronal Mass Ejections," International Conference of Solar Eruptions, Catholic University, March 6-9, 2000

Joy, M.K., Shipley, A.F., Cash, W.C., Carter, J.M., Zissa, D.E., Cuntz, M.: 2000, "Experimental results from a grazing incidence X-ray interferometer", in: X-Ray Optics, Instruments, and Missions III, eds. J.E. Truemper and B. Aschenbach, Proceedings SPIE, Vol. 4012, p. 270

Saar, S.H., & Cuntz, M.: 2000, "A search for Ca~II emission enhancement in stars due to nearby giant planets", Mon. Not. Royal Astron. Society, submitted

Cuntz, M., Saar, S.H., Musielak, Z.E.: 2000, "On stellar activity enhancement due to interactions with extrasolar giant planets", Astrophysical Journal Letters, 533, L151

Brown, A., Harper, G., Bennett, P.D., Baade, R., Kirsch, T., Schroeder, K.-P., Dumm, T., Cuntz, M.: 2001, "Understanding the role of binarity on mass loss and atmospheric structure in detached systems", in: Cool Stars, Stellar Systems, and the Sun, Eleventh Cambridge Workshop, eds. R.J. Garcia Lopez, R. Rebolo, and M.R. Zapatero Osorio, A. S. P. Conference Series, Vol. 223, p. 411

Falconer, D.A. "A Prospective Method for Predicting Coronal Mass Ejections from Vector Magnetograms," accepted JGR Space Physics 2001,

Falconer, D.A., & Davila, J.M. "Huge Coronal Structures and Heating Constraints Determined from SERTS Observations," Ap.J., 547, 1109, 2001,

Cuntz, M., Musielak, Z.E., Saar, S.H.: 2001, "Analyzing the effects of planets and brown dwarfs on stellar chromospheric and coronal activity", in: Cool Stars, Stellar Systems, and the Sun, Eleventh Cambridge Workshop, eds. R.J. Garcia Lopez, R. Rebolo, and M.R. Zapatero Osorio, A. S. P. Conference Series, Vol. 223, CD-1528

Cuntz, M., Rossi, P., Ulmschneider, P.: 2001, "Properties of longitudinal flux tube waves. II. Limiting shock strength behavior", Astronomy and Astrophysics, submitted

Cuntz, M., Suess, S.T.: 2001, "Properties of longitudinal flux tube waves. III. Wave propagation in solar and stellar wind flows", Astronomy and Astrophysics, to be submitted

Cuntz, M., Suess, S.T.: 2001, "Shock formation of slow magnetosonic waves in coronal plumes", Astrophysical Journal Letters, 549, L143 Saar, S.H., Cuntz, M.: 2001, "A search for Ca II emission enhancement in stars due to nearby giant planets", Monthly Notices of the Royal Astronomical Society, in press

Cuntz, M., Ulmschneider, P., Rammacher, W., Musielak, Z.E., Saar, S.H.: 2001, "Self-consistent magnetic / acoustic chromosphere models of late-type stars", in: Cool Stars, Stellar Systems, and the Sun, Eleventh Cambridge Workshop, eds. R.J. Garcia Lopez, R. Rebolo, and M.R. Zapatero Osorio, A. S. P. Conference Series, Vol. 223, CD-913.

(4) /CW/ IN/75

HIGH ENERGY PLASMA SPACE PROPULSION 537590 20011161B9

In order to meet NASA's challenge on Advanced concept activity in the propulsion area, we initiated a new program entitled "High Energy Plasma Space Propulsion Studies" within the current cooperative agreement in 1998. The goals of this work are to gain further understanding of the engine of the AIMStar spacecraft, a concept which was developed at Penn State University (1), and to develop a prototype concept for the engine.

The AIMStar engine concept was developed at Penn State University several years ago as a hybrid between antimatter and fusion technologies. Because of limited amounts of antimatter available, and concurrently the demonstrated ability for antiprotons to efficiently ignite nuclear fusion reactions, it was felt that this was a very good match.

Investigations have been made concerning the performance of the reaction trap. This is a small Penning-like electromagnetic trap, which is used to simultaneously confine antiprotons and fusion fuels. Small DHe3 or DT droplets, containing a few percent molar of a fissile material, are injected into the trap, filled with antiprotons. We have found that it is important to separate the antiprotons into two adjacent wells, to inject he droplet between them and to simultaneously bring the antiprotons to the center of the trap, surrounding the droplet. Our previous concept had the droplet falling onto one cloud of antiprotons. This proved to be inefficient, as the droplet tended to evaporate away from the cloud as it interacted on its surface.

We have found that the most efficient method of constructing the droplet is to build a very thin shell of fissile material, with thickness of perhaps 10 microns, and to fill the shell with a cryogenically prepared mixture of DHe3 or DT. The outside diameter of the droplet is about 50 microns. The antiprotons interact with the fissile shell, and one of the two fission fragments injects itself into the fusion fuel. We find that 10E10 antiprotons interacting uniformly over the surface of the droplet can raise the temperature of the droplet to about 10 eV. This temperature is